Guide to Negative Pressure Wound Therapy (NPWT)

Also known as vacuum-assisted wound closure (VAC), NPWT is a dressing system that continuously or intermittently applies negative pressure across the surface of wounds that are acute, chronic, complex, or difficult-to-heal (Centers for Medicare and Medicaid Services [CMS], 2014). NPWT devices support a moist wound healing environment, pull wound edges together, promote blood flow and granulation tissue formation, decrease edema and remove infectious materials. Many of these devices are small and lightweight, allowing patients full mobility. Due to varying designs, it is important that you become familiar with the manufacturer instructions for the specific device in use.

Indications

Wounds that benefit most from NPWT (CMS, 2014; Wound Care Centers, 2016)

- Acute or surgical wounds at high risk for infection
- Open abdominal incisions or dehisced surgical wounds
- Traumatic wounds and burns
- Reconstructive surgery: skin flaps and preparation for skin graft sites
- Chronic wounds such as venous insufficiency ulcers, diabetic foot ulcers, and pressure ulcers
- Wounds at high risk for infection
- Wounds with copious drainage
- Meshed grafts, to either secure the graft in place or improve epithelialization
- Adjunct therapy to skin graft/flap procedures

Advantages of NPWT Compared to Traditional Forms of Wound Therapy (Wound Care Centers, 2016)

- Improved healing of transplanted skin and decreased length of hospital stay for patients receiving split thickness skin grafts.
- Fewer wound infections in patients following orthopedic trauma and open fractures.
- Improved wound healing, shorter length of stay, lower hospital mortality in patients with mediastinitis and unsuccessful wound healing following sternotomy.
- Enhanced wound healing in patients with diabetes mellitus and gangrene that might require amputation.

Risks and Complications

- Pain – premedicate prior to dressing changes
- Retention of foreign bodies from the dressing
- Bleeding – apply firm pressure to the wound surface if minor bleeding occurs during dressing changes; for severe hemorrhage, apply direct pressure and contact provider as surgery may be needed to control bleeding based on the source (i.e. exposed vessel or vascular graft) (Gestring, 2017)
• Infection – discontinue NPWT dressing, irrigate and debride the wound, obtain wound cultures, and initiate empiric antibiotics as prescribed (Gestring, 2017)
• Enterocutaneous fistula – while NPWT may assist with the closure of postoperative fistulas, they may also cause enteric fistulas to form (Gestring, 2017)
• Possible death (from bleeding or infection)

Factors that increase a patient’s risk for adverse events with NPWT

• Anticoagulant or platelet aggregation inhibitor therapy
• Any factors that increase patient risk for bleeding and hemorrhage
• Friable or infected blood vessels
• Vascular anastomosis
• Infected wounds
• Osteomyelitis
• Spinal cord injury
• Enteric fistulas
• Exposed organs, vessels, nerves, tendons, and ligaments

Contraindications (Rock, 2014; Gestring, 2017; Wound Care Centers, 2016)

• Inadequately debrided wounds
• Ischemic wounds, necrotic tissue with eschar, fragile skin
• Untreated osteomyelitis
• Cancer in the wound
• Untreated coagulopathy
• Unexplored fistulas
• Exposed vasculature, nerves, anastomotic site, vital organs
• Osteomyelitis
• Infection
• Adhesive allergy

What should the NPWT orders include?

• Wound dressing material (foam or gauze) and wound adjunct (protective non-adherent, petroleum or silver dressing) (Rock, 2014)
• Negative pressure setting (-20 to -175 mm Hg) (Rock, 2014), typically set between -175 and -125 mm Hg (Wound Care Centers, 2016)
• Therapy setting (continuous, intermittent or variable) (Rock, 2014)
• Frequency of dressing change; usually every 1 – 7 days or as needed (Wound Care Centers, 2016; Gestring, 2017)
Wound Care Tips (Rock, 2014)

- Use protective barriers, such as non-adherent or petroleum gauze, to protect sutured blood vessels or organs near areas being treated with NPWT.
- Avoid over packing the wound too tightly with foam; this prevents negative pressure from reaching the wound bed, causing exudate to accumulate.
- Avoid placing the tubing over bony prominences, skinfolds, creases, and weight-bearing surfaces to prevent tubing-related pressure ulcers.
- Count and document all pieces of foam or gauze on the outer dressing and in the medical record, to help prevent retention of materials in the wound; whenever possible, apply foam dressing as a single piece.
- With a heavily colonized or infected wound, consider changing the dressing every 12 to 24 hours as directed by the prescribing clinician.

General Patient Care

- Assess your patient for wound healing issues, such as poor nutrition (low protein levels), diminished oxygenation, decreased circulation, diabetes, smoking, obesity, foreign bodies, infection and low hemoglobin levels (Rock, 2014).
- Assess and manage your patient’s pain; be sure to premedicate as needed before each dressing change.
- Provide patient education on:
  - Alarms and device ‘noise’
  - Dressing changes
  - Signs of complications, and to seek medical care immediately if bleeding occurs
- Patients should seek medical care if they notice:
  - Significant change in the color of the drainage (cloudy or bright red)
  - Excessive bleeding under the clear dressing, in the tubing or in the canister
  - Increased redness or odor from the wound
  - Increased pain
  - The device has been left off for more than 2 hours
  - Signs of infection, such as fever, redness or swelling of the wound, itching/rash, warmth, pus or foul-smelling drainage
  - Signs of allergic reaction to the drape/dressing including redness, swelling, rash, hives, or severe itching
  - Patient should seek immediate medical assistance if they have trouble breathing.

Trouble Shooting the Device

- Confirm that the unit is on and set to the appropriate negative pressure, that the foam is collapsed, and the NPWT device is maintaining the prescribed therapy (Rock, 2014).
- Be sure the negative pressure seal has not been broken and leaks are minimal. (Wound Care Centers, 2016).
• Ensure there are no kinks in the tubing and that all clamps are open. (Wound Care Centers, 2016).
• Address and resolve alarm issues; reasons for the unit to alarm include: canister is full, there is a leak in the system, battery is low/dead, therapy is not activated.
• Do not leave the device off for more than two hours; while device is off, apply a moist dressing (Rock, 2014) and notify the prescribing clinician immediately.
• Avoid getting the electrical device wet; educate the patient to disconnect the unit from the tubing and clamp the tubing before bathing.
• Check the drainage chamber to make sure it is filling correctly and does not need changing (Wound Care Centers, 2016).

References: